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## **Automatic Processes in Aggression: Conceptual and Assessment Issues**

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This editorial to the special section “Automatic Processes in Aggression: Conceptual and Assessment Issues” introduces major research lines, all of which culminate in recent advances in the measurement of automatic components in aggressive behavior. Researchers of almost all psychological disciplines have stressed increasingly the importance of automatic components to gain a comprehensive psychological understanding of human behavior. This is reflected in current dual-process theories according to which both controlled processes and rather automatic processes elicit behavior in a synergistic or antagonistic way. As a consequence, complementing self-reports (assumed to assess predominantly controlled processes) by the use of implicit measures (assumed to assess predominantly automatic processes) has become common practice in various domains. We familiarize the reader with the three contributions that illuminate how such a distinction can further our understanding of human aggression. At the same time, it becomes evident that there is a long way that method-oriented researchers need to go before we can fully comprehend how to best measure automatic processes in aggression. We see the present special section as an invigorating call to contribute to this endeavor. *Aggr. Behav.* 41:44–50 2015. © 2014 Wiley Periodicals, Inc.

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## **INTRODUCTION**

When Shiffrin and Schneider (1977) distinguished between automatic and controlled information processing, they opened the gates for what has become one of the most important distinctions in contemporary psychology. Although their initial conception of automaticity and control was rather mutually exclusive (with the presence of deliberate and controlled processes more or less ruling out automatic processes), their seminal work was the starting point of the study and understanding of automatic and controlled processes from both a theoretical and an empirical perspective. In what follows, we will argue that the necessity to incorporate automatic processes in aggression theories research has been recognized quite some time ago. However, the empirical evidence in this regard is still scarce – as pointed out by several researchers not too long ago (e.g., Berkowitz, 2008; Richetin, Richardson, & Mason, 2010; Richetin & Richardson, 2008; Todorov & Bargh, 2002). With the present special section, we aim at filling this void and at inspiring further research. Three contributions open a fascinating view of the progress made in the last few years, specifically on how to predict aggressive urges that seem to defy our control, with the help of implicit measures.

### **The Dual-Process Perspective**

All contributions in this special section derive their theoretical underpinnings from theories that distinguish between spontaneous (automatic) and reflective (controlled) information processing on the way to (aggressive) behavior. Current dual-process theories

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(e.g., Strack & Deutsch, 2003, 2004) have expanded Shiffrin and Schneider's views, suggesting that automatic and controlled processes may run in parallel, with various possible interactions between them (Gawronski & Bodenhausen, 2006). For instance, according to the comprehensive Reflective-Impulsive Model (RIM; Strack & Deutsch, 2004), human behavior is governed by two information processing systems, the impulsive system and the reflective system. Both have very different properties but can activate behavioral schemas in a synergistic or antagonistic way along a common final pathway.

The impulsive system relies on the operation of an associative network in memory. Upon perceptual or imaginative input, activation is thought to spread through the network as fast as the associative strengths between the involved nodes allow. The idea of spreading activation is a metaphor for a process that occurs unintentionally upon cue-impact, fast and efficiently so, without requiring attentional resources and awareness, and more often than not in an unstoppable, uncontrollable fashion – in short, this process is assumed to run automatically (Bargh, 1994). Unlike the impulsive system, the reflective system is conceptualized as handling complex computations, attaching truth values to statements, engaging in syllogistic reasoning, and making deliberate decisions about future actions. It crucially depends on active attention allocation, sufficient time, and cognitive resources. Motivational and emotional influences on behavior are accounted for by postulating that they temporarily or chronically activate specific knowledge structures and behavior scripts.

Along with the notion that automatic processes are as important as are controlled processes for understanding human information processing and behavior, the question arose how to assess automatic and controlled processes. If the goal is behavioral prediction at the individual level, the measurement outcome has to reliably reflect a trait-like disposition. Dozens of measures have been developed, often employed in experimental settings, and with each single measure came the hope of reliably assessing inter-individual differences in automatic processes too (for an overview, see Gawronski & De Houwer, 2014).

Notwithstanding research that shows that no measurement outcome can be regarded as process-pure (e.g., Sherman, 2009; Klauer, 2014), there is strong convergence on the idea that self-reports mostly assess controlled, deliberative processes of the reflective system, whereas so-called implicit measures are predominantly based on automatic, spontaneous and associative processes residing in the impulsive system (e.g., Asendorpf, Banse, & Mücke, 2002). Implicit measures, in contrast to self-reports, do not directly ask individuals for their attitudes or self-concepts. Instead, inter-individual differences in participants' attitudes or self-concepts indirectly translate to the participants' performance in specific tasks. Unlike self-reports, indirect measures require bigger inferential leaps from performance outcomes (e.g., response latencies or error rates) of specific measurement procedures (e.g., stimulus sorting task) to the construct of interest (e.g., aggressive disposition). So the individual differences in task performance are taken to reflect differences in the cognitive processes underlying the construct of interest. For instance, a highly prominent implicit measure, the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) is essentially a doubled-barreled stimulus sorting procedure. To the extent that such measurement procedures conceal what exactly is being measured, so that the measure works rather independently from a test-taker's intention, to the extent that they use very fast and efficient cognitive operations, but offer only reduced means to distort the measurement process, these measures are typically addressed as implicit measures. As such they are assumed to capture predominantly automatic cognitive processes (Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009).

Indeed, empirical research in the past two decades has supported the view that both automatic processes (as mostly assessed via implicit measures) and controlled processes (as mostly assessed via self-report measures) exert additive and interactive influences on behavior (e.g., Fries, Hofmann, & Schmitt, 2008; Perugini, Richetin, & Zanna, 2010). It was shown that cognitive processes can be automatically driven by external cues, and that they reliably lead to the execution of human behavior (e.g., Bargh, 1994). Crucially, individuals are often not even aware of this happening until they find themselves having violated their own deliberate behavioral standards. In other words, individuals often lack the capacity to accurately introspect and report accordingly on the causes underlying their behavior (Nisbett & Wilson, 1977), either because they are unaware of these causes, or because the cognitive processes begin and vanish too quickly to be identified. Besides these introspective limits, self-report data have been shown to be subject to self-presentation, impression management, and socially desirable responding (e.g., Paulhus, 1984). In line with the dual-process perspective, complementing self-reports by the use of implicit measures has therefore started to become common practice in various domains, including the following: clinical psychology (e.g., anxiety, phobias; Roefs et al., 2011); social psychology (e.g., intergroup attitudes and contact; Greenwald, Poehlman, Uhlman, &

Banaji, 2009); differential psychology (e.g., Big Five; Back, Schmukle, & Egloff, 2009; Schmukle, Back, & Egloff, 2008); and everyday behavior (e.g., eating, drinking; Friese & Hofmann, 2009).

In the domain of aggression, with few notable exceptions, a comparable treatment of assessing automatic processes in the sense of trait-like dispositions by implicit measures has largely been neglected (Berkowitz, 2008; Richetin & Richardson, 2008; Todorov & Bargh, 2002). This is surprising because from an applied perspective there is a need to improve the quality of diagnostic tools, for instance, in psychiatric and forensic contexts, in which individuals might not be willing or not be able to respond truthfully in self-report measures. Furthermore, from a theoretical perspective, in several popular models of aggression (e.g., the General Aggression Model, Anderson & Bushman, 2002; see also Crick & Dodge, 1994; Huesmann, 1997, 1998; Wilkowski & Robinson, 2010) it is proposed that automatic cognitive processes are central for the formation of aggressive behavior. By acknowledging the interplay of both automatic and controlled processes in aggression, the dual-process perspective has been stressed in aggression models early on, partly even before the development of generic dual-process models that attracted considerable attention in various psychological domains.

### **Automatic Processes in Aggression**

According to the General Aggression Model (GAM; Anderson & Bushman, 2002), aggressive behavior is predominantly an outcome of the spontaneous appraisal of social situations, which evoke specific cognitions, affective reactions, and arousal. Only if the result of the immediate appraisal is unsatisfactory and only if there are sufficient cognitive, motivational, and external resources (e.g., time to reflect), can a more complex re-appraisal take place and override any activated aggressive urges, resulting in the implementation of a rather thoughtful, possibly less aggressive action. This aspect of the GAM converges with the more recent dual-process accounts of human information processing (Strack & Deutsch, 2004; see also Smith & DeCoster, 2000; Wilson, Lindsey, & Schooler, 2000). It has to be noted, though, that the GAM is an example for default-interventionist models, whereas dual-process models often postulate the parallel effectiveness of two distinct types of information, or the operation of two distinct systems of information processing. It nevertheless appears plausible that implicit measures have the power to capture the automatic processes underlying the immediate appraisal of a given situation as hostile, an appraisal that may result in an individual's aggressive behavior.

Other models of aggression such as the Cognitive Neoassociation Theory (e.g., Berkowitz, 1990; see also the models by Crick & Dodge, 1994; Huesmann, 1997, 1998) or the more recent Integrative Cognitive Model of Trait Anger and Reactive Aggression (ICM; Wilkowski & Robinson, 2008, 2010) stress the cognitive basis of aggression, too. Hence, several researchers converge—although to different degrees—on the idea of a social information processing account of aggression. This suggests an assessment approach going beyond self-report measures.

Specifically, according to the GAM, aggressive individuals differ from non-aggressive individuals by having more elaborated aggressive knowledge structures, for instance, stronger mental representations of the self as aggressive, more accessible scripts of aggressive behavior, and more positive attitudes toward aggressive behavior than non-aggressive individuals (Bushman, 1996). Yet the GAM not only incorporates personality-driven, but also situation-specific processes. It accounts for situational cues known to elicit aggression (e.g., provocation) by considering them as primes that, in turn, activate trait-like cognitive schemas related to anger, arousal, hostility, and eventually aggressive behavior. At the intersection, situation-factors may condense into personality. Being frequently exposed to violent situations (e.g., domestic or media violence) and activating aggressive behavioral scripts repeatedly (e.g., by engaging in physical fights or playing violent video games) raise the likelihood that hostile thoughts, schemata, and behavioral scripts become chronically highly available, thus nourishing trait aggressiveness. The situation-specific activation of aggression-related thoughts, emotions, and behaviors increases the likelihood that these aggression-related knowledge structures get activated in the future (Bushman, 1996, 1998).

Capturing these aggression-related knowledge structures thus appears to be a promising avenue for the prediction of aggressive behavior, and according to recent advances, implicit measures are particularly suited for this goal. To be clear, by stressing the importance of an assessment approach beyond mere self-report, we refer to measures that meet the psychometric requirements for assessing inter-individual differences in trait-like dispositions of aggression-related automatic processes. We do not refer to the numerous studies that used, for instance, reading reaction time tasks, lexical decision tasks, or other measures of attention bias and perception processes as dependent variables after experimental manipulations (e.g., Anderson and Dill, 2000). Of course, many of these same types of tasks—sufficient reliability provided—can be used to assess automatic inter-individual differences in non-experimental contexts.

Indeed, the potential of implicit measures to tap dispositional automatic processes underlying aggression is not fully illuminated yet. The theoretical claims emphasizing the importance of automatic processes in aggression are not yet backed up by empirical evidence (e.g., Berkowitz, 2008). Open questions are, for instance: How can we reliably assess the trait-like automatic processes underlying aggression? How much does the assessment of automatic processes in aggression add to controlled processes as measured by self-reports? Are there factors moderating the impact of automatic versus controlled processes on the execution of aggressive behavior? What are the main chances and challenges in research on automatic processes in aggression?

### **The Special Section**

The main goal of the special section is to inspire a stronger focus on automatic processes in aggression. Implicit measures may expand our understanding of the automatic components of aggression and thereby influence the theoretical models we adopt, or the research designs we employ, to investigate aggressive urges and outbursts.

Three articles in this special section are devoted to aggressiveness as part of the self-concept as commonly found in personality-psychological approaches. They are united by using variants of one of the most popular implicit measures, the IAT (Greenwald et al., 1998). The Aggressiveness-IAT (Agg-IAT) is designed to assess associative processes that are relevant for the self-concept of aggressiveness, in other words the number and strengths of memory associations between mental representations related to the self and aggressive scripts. The strength of these associations are mostly based on the frequency of co-activation of the respective memory nodes, so they should not only mirror previous experiences but also qualify as predictors of future aggressive behavior. Whereas the first two articles explore the specific utility of the Agg-IAT as a trait-like predictor of individual differences in aggressive behavior, the third contribution widens the trait perspective by suggesting that there are other stable inter-individual differences in automatic processes not based on spontaneous self-aggressive associations, but rather on differences in attentional biases.

More specifically, the first article by Banse, Messer, & Fischer (2014) presents a comprehensive set of four studies investigating the psychometric properties of the Agg-IAT. Their results consistently indicate that the Agg-IAT has its merits in predicting aggressive behavior over and above common self-report measures of aggressiveness. The authors theoretically postulate, and empirically demonstrate, incremental validity when adding implicit measures to the set of predictors of aggressive behavior. Banse and colleagues also provide first evidence for the utility of the Agg-IAT as a measure of trait-aggressiveness.

In the second article, Lemmer, Gollwitzer, & Banse (2014) scrutinize to what extent the Agg-IAT reliably captures stable trait variance or occasion-specific variance. Only rarely has anyone inspected whether IATs contain sufficient trait variance to qualify for long-term predictions, or whether they reflect mostly occasion-specific variance on the basis of a participant's current mental state of recently activated (here: aggressive) concepts. Using a large-scale study on a longitudinal panel of children and adolescents, the authors show that the Agg-IAT reflects trait- and state-specific variance at the same time, and that the trait-specific variance shows promising signs of convergent and discriminant validity for aggression-related indicators. This pattern confirms that researchers can use the Agg-IAT as a measure of trait-aggressiveness, but at the same time the Agg-IAT reflects situational influences too. This opens a window for aggression researchers who wish to objectively assess short-term experimental effects on participants' aggressive dispositions in the lab (e.g., Bluemke, Friedrich, & Zumbach, 2010).

In the third article, Brugman et al. (2014) use a single-category variant of the Agg-IAT to assess the self-concept of aggressiveness. They remind us of a whole range of implicit measures. None of them can assume an exclusive role to automatic processes in aggression. This contribution widens the methodological repertoire, by showing that the Emotional Stroop task can predict aggressive behavior too. Different from self-aggressive associations, it reflects inter-individual differences in attentional bias for aggressive cues. Brugman and colleagues also observed a dissociation when predicting reactive and proactive aggression by the two types of implicit measures. This finding bolsters the debated, yet theoretically important distinction between reactive and proactive aggression, both of which were demonstrated simultaneously in a noise-blast task. Apart from clarifying the theoretical concepts, this finding also indicates that attention to different kinds of implicit measures is warranted.

### **Future Research**

Based on the current empirical evidence, we envision several fruitful avenues for future research on automatic processes in aggression in conjunction with implicit measures. First, although it remains an unattainable ideal, the quest for "the best" implicit measure is far from over. Most researchers currently prefer the IAT, typically using measures based on the self-concept. Yet there are many other implicit measurement procedures that have

not been applied in the domain of aggression, and whose relevance is untested (for an overview see Gawronski & Houwer, 2014). Even when sticking with one family of implicit measures, such as the IAT, many procedural aspects have not been explored with regard to their impact on measurement validity. As a consequence, researchers are constantly at risk of underestimating the importance of automatic components in aggressive behavior for purely methodological reasons. For instance, some authors (e.g., Banse et al., 2014; Bluemke & Fries, 2012) have pinpointed several stimulus selections against each other, but other procedural aspects, such as the presence versus absence of the IAT comparison category (“other”), may have an unwarranted impact on the quality of measurement too (Karpinski, 2004; Karpinski & Steinman, 2006; see also Brugman et al., 2014).

Once one crosses variants of implicit measures with one’s constructs of interest, the number of explorations increases rapidly. Although we do not expect an answer, or specific solution, that could rigidly bind all researchers, we do hope for a clearer picture as to why some measures work better than others in specific situations.

Second, we expect that parameters reflecting automatic information processing within the measurement procedures will be isolated gradually by using mathematical modeling approaches. The currently predominant algorithms for analyzing implicit measures confound various cognitive influences, some of which do not reflect automatic or associative processes. One future goal will be to identify parameters that are as process-pure as possible. For instance, the QUAD model (see Conrey, Sherman, Gawronski, Hugenberg, & Groom, 2005) estimates parameters for the influence that associations between target and attribute categories have on the task performance (automatic process); yet it also estimates one parameter for the ability to overcome biased responses subsequent to the activation of automatic associations (controlled process). Competing multinomial models exist that, like the QUAD model, are based on accuracy rates but are parameterized differently from the QUAD model. The ABC model (Stahl & Degner, 2007), the TRIP model (Nadarevic & Erdfelder, 2011), and the ReAL model (Meissner & Rothermund, 2013) represent some highly relevant competitors in the challenge for assessing co-occurring automatic and controlled processes in implicit measures. Another promising road is the use of diffusion models that incorporate the information gained from response accuracy distributions and simultaneously from response latency distributions (Ratcliff, 1978; for an application to the IAT, see Klauer, Voss, Schmitz, & Teige-Mocigemba, 2007; for an application to priming procedures, see Voss, Rothermund, Gast, & Wentura, 2013).

Regardless of the expected progress in the field of modeling, we caution against identifying specific parameters from cognitive models with automaticity as such. Just as past research—prematurely—equated implicit measurement outcomes with various aspects of automaticity (regarding unaware, efficient, unintentional, uncontrollable processes), we fear that the same “hype” might occur with parameters derived from computational models of cognitive processes. Not only does most of the evidence favor a componential view of automaticity anyway (De Houwer et al., 2009), but for each feature and for every measurement procedure specific evidence on the automaticity assumption is required. Just because a particular type of measurement outcome of a specific implicit measure—alternatively an estimated process parameter—has demonstrated certain features of automaticity in the past, does not mean that the same features will generalize to other domains, say aggression. Also, any such evidence does not imply that other untested features of automaticity hold for a particular measure, and they certainly do not generalize to different types of implicit measures by default.

Third, we expect to see more and more research on the prediction of automatic components in aggressive behavior with a focus on inter-individual differences. Such research may involve situational or intrapersonal moderating variables that modulate when exactly the utility of an implicit measure exceeds that of a self-report measure (e.g., in the presence of high anger, low trait self-control, or low executive control). It seems only natural that “hot” cognition predisposes some individuals more than others to reactively retaliate, so that some implicit measures may be suitable to specifically predict reactive aggression. Yet, it is not at all unlikely that implicit measures allow a nuanced view on proactive aggression too (as found by Brugman et al., 2014). In fact, the case can be made that some people have aggressive urges that seem to come out of the blue and predispose them to aggress spontaneously and proactively without any triggers (see, e.g., Bluemke & Fries, 2012, Exp. 3). As of yet, our limited knowledge in this area indicates that science has just set a foot onto the path of automatic and controlled components in the generation of (reactive vs. proactive) aggressive behavior.

To summarize, if the present special section is well-received, we expect to see an increase in research activities that complement the picture on human aggression by invoking implicit measures. We expect more and more aggression researchers to look closer at what exactly can be considered the automatic processes underlying implicit measures and how the biggest share of meaningful information can be obtained from such methods, potentially shifting what counts as state-of-the-

art techniques. If our efforts instigate future investigations on how any antisocial consequences of automatic components underlying human aggression can be prevented or changed, we will be more than happy to have worked towards this goal.

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